



**ON-LINE GUIDE TO
DIAGNOSTIC ELECTRON MICROSCOPY**

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<http://synapses.clm.utexas.edu/atlas/contents.stm>

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Introduction

The goal of this first-aid manual, designed mainly for use by The Fingerland Department of Pathology, was to offer students and starting electron microscopists specializing in diagnostics of human diseases a quick visual overview of the ultrastructural appearance of some basic pathological changes. It is far from being extensive enough to embrace the whole range of this examination method. Users of our atlas are assumed to already be acquainted with basic ultrastructural cytology and histology of organ systems. This guide is not a textbook. The figure captions are minimalized and will be updated, completed or corrected in time. For further extensive analysis of structures we urge you to consult, for example,

Jan Vincents Johannessen:
Electron microscopy in human medicine series
McGraw-Hill, 1978-1985,

Ann M. Dvorak, Rita A. Monahan-Earley:
Diagnostic Ultrastructural Pathology. Vol. I - III,
CRC Press, 1995,

Feroze N. Ghadially:
Ultrastructural Pathology of the Cell and Matrix
Fourth edition, Vol. I and II., Boston, Butterworth–Heinemann, 1997,

G. R. Dickerson: Diagnostic Electron Microscopy,
Springer, 2000

The content of this Guide is a collection of some cases only, examined during several decades in our laboratory. About 1 500 of electron micrographs, on purpose often repeated in many variations, may serve to show a variability in details and developmental stages of a disease. Histopathologists and even more the electron microscopists, must take into consideration during their decisions also artifacts caused by an inadequate fixation and a mechanical damage during a withdrawal of a tissue and an autolysis in samples from autopsies. Some of these are shown in our figures, too. Histopathologists have magnification scales firmly imprinted into their memories and therefore their published pictures are usually free of scales. A short table of sizes of some ultrastructural elements is attached.

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The samples of which micrographs are presented in this Guide were withdrawn from experimental animals for reasons of research in accordance with the University Medical

Ethics Committee or from human tissues withdrawn with informed consent for diagnostic or therapeutical reasons.

The presented figures are not containing any private data and the authors have no objections against their non-commercial use. In such a case, the source should be referred as follows:

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Relative sizes of some cellular ultrastructural elements

1000 nanometers (nm) = 1 micrometer (μm)

1000 micrometers (μm) = 1 millimeter (mm)

Structure	Thickness, distance, or diameter (nm)
cleft in gap junction	2
microfilaments (actin)	5 - 7
plasma membrane	7 - 8
intermediar filaments (neurofilaments, gliofilaments)	8 - 12
myosin	12 - 15
ribosomes	15 - 25
intercellular clefts in neuropil	about 20
microtubules	20 - 25
glycogen granules	30
synaptic vesicles	40 - 60
periodicity in collagen	50 - 60
dense-cored vesicles	60 - 120
nuclear pores	90
primary lysosomes	100 - 200
centriole	100 - 250
neurosecretory granules	100 - 400
mitochondria	100 - 500
cilia	200 - 400
human hair	70,000